

REMARKS

Claim 44 has been cancelled. Claims 39, 42 and 43 have been amended. The amendment to claim 39 is supported by the Specification, at least at page 2, lines 18-21. The amendments to claims 42 and 43 provide consistency with amended claim 39. No new matter has been added. Claims 21-43 are present in the application; and claims 21-25 and 28-43 are active.

INTERVIEW SUMMARY

Applicants would like to thank Examiner Lee for the helpful discussion with Applicants' representative on September 18, 2006. During this discussion, the Brokman reference was reviewed with respect to the claims, and the present amendment to claim 39 was discussed.

REQUEST FOR RECONSIDERATION

Delivery of fuel and oxidant to the electrodes of a fuel cell can be problematic. The present invention includes a fuel cell comprising an emulsion comprising a fluorinated solvent, a surfactant and an aqueous electrolyte. An emulsion is a combination of at least two liquids, where one of the liquids is present in the form of droplets in the other liquid. IUPAC, *Compendium of Chemical Terminology: IUPAC Recommendations*, 2nd ed., compiled by A. D. McNaught and A. Wilkinson, Blackwell, Oxford (1997). The emulsion included in the present invention can combine the gas transporting capabilities of fluorinated liquids with the charge conductivity of aqueous electrolytes, providing for improved liquid-phase delivery of a gas, such as a fuel or an oxidant, to an electrode.

Rejection under 35 U.S.C. § 103

The rejection of the claims as obvious under 35 U.S.C. § 103(a) over U.S. Patent Application Publication No. 2004/0058217 A1 to Ohlsen et al. (Ohlsen) in view of U.S. Patent No. 5,185,218 to Brokman et al. (Brokman) and DuPont Zonyl®

FS-62 technical data sheet (Zonyl® FS-62) is respectfully traversed. The Brokman reference teaches away from the combination, in a fluid, of a fluorinated solvent and an aqueous electrolyte. In contrast, independent claim 39 includes an emulsion comprising a fluorinated solvent, an aqueous electrolyte and a surfactant.

Ohlsen discloses a microfluidic fuel cell in which a liquid fuel/electrolyte mixture and a liquid oxidant/electrolyte mixture flow between the anode and cathode by multistream laminar flow (para. [0020]). The liquid fuel/electrolyte mixture is in contact with the anode, and the liquid oxidant/electrolyte mixture is in contact with the cathode (FIG. 2 and para [0020]).

Zonyl® FS-62 discloses an anionic fluorosurfactant that can be used in a variety of liquid systems.

Brokman discloses an air cathode for use in batteries and in fuel cells (col. 3, lines 5-8). An oxidant is supplied to the air cathode using “an oxygen-rich electrolyte-immiscible organic fluid,” which may be a fluorinated hydrocarbon (col. 1, lines 63-66; col. 2, lines 12-18). This organic fluid is pumped through a metallic mat that serves as the air cathode (col. 3, lines 18-47). The metallic mat includes a waterproof barrier layer on one side and a cathode catalyst layer on the barrier layer (col. 3, lines 27-31, 40-45). The purpose of the waterproof barrier layer is to keep the electrolyte of the fuel cell or battery from flooding the metallic mat (col. 4, lines 30-43). Thus, contact of the electrolyte with the metallic mat, and with the organic fluid within the mat, is effectively prevented. There is no teaching in Brokman of an emulsion of the oxygen-rich electrolyte-immiscible organic fluid with the electrolyte.

Brokman teaches away from the combination of a fluorinated solvent with an electrolyte, such as the electrolyte of Ohlsen. In Brokman, the electrolyte is prevented from contacting the metallic mat of the air cathode by the waterproof barrier layer. If the electrolyte were to contact the metallic mat and the fluid within the mat, undesirable flooding would occur. Thus, Brokman teaches that the oxygen-rich electrolyte-immiscible organic fluid (which may be a fluorinated

solvent) is to be kept separate from, and not combined with, the electrolyte. Accordingly, Brokman teaches away from the present invention.

Independent claim 39 recites an emulsion comprising a fluorinated solvent, an aqueous electrolyte and a surfactant. The combination of the references would not provide a fuel cell comprising an emulsion comprising a fluorinated solvent, an aqueous electrolyte and a surfactant. Accordingly, claims 21-43 are not obvious over the applied references. Applicants respectfully request that this rejection be withdrawn.

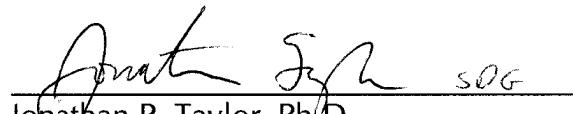
CONCLUSION

All of the grounds raised in the present Office Action for rejecting the application are believed to be overcome or rendered moot based on the remarks above. Thus, it is respectfully submitted that all of the presently presented claims are in form for allowance, and such action is requested. Should the Examiner feel a discussion would expedite the prosecution of this application, the Examiner is kindly invited to contact the undersigned at (312) 876-1400.

Respectfully submitted,

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Evan Law Group LLC
600 West Jackson Blvd., Suite 625
Chicago, IL 60661
(312) 876-1400



Jonathan P. Taylor, Ph.D.
Registration No. 48,338